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Increasing COVID-19 Testing Capability through Pooled Testing

One of the most significant challenges in tackling the COVID-19 pandemic in the United States was the shortage of test capability. At the beginning of April 2020, when the U.S. confirmed infections were approaching 90,000 and deaths were over 1,000,[1] fewer than 200,000 tests per day were being performed, much less than public health experts had recommended. Also, in many cases, it often took several days or even weeks for a person to receive the test result.[2] Many experts believed the testing turnaround time was one of the most significant failure points to contain COVID-19. Other countries that ramped up testing capability to the turnaround time of several hours could flatten the infection curve more effectively than the United States was doing. Also, the availability of rapid test results during the early onset of a pandemic can reduce the total number of tests.

Heading into fall 2020 and winter of 2021, U.S. healthcare experts continued to cite testing capability (and fast results) as the first necessary condition of getting back to everyday life. However, it remained one of the most challenging problems because of reagent[i] and testing machine shortages. One idea to increase the testing capacity was called a pooled test. As the name suggests, a pooled test combined samples from multiple people in a single tube and then ran a single test. China used this strategy to test large populations in Wuhan and Beijing in a matter of days, and so did several other countries including Israel and Germany.[3] The technique had the potential to resolve the testing bottlenecks in the United States. Some U.S. colleges, such as Michigan State University, had piloted the pooled test.

When a pooled test of specimen samples from multiple people came back negative, one could assume that all individuals in the sample were negative (i.e., not infected). Thus, a single pooled test of 10 people, for example, could do the work of 10 separate individual tests.

If the pooled test came back positive, it was necessary to then separately test each person. But given that far more people tested negative than positive, pooled tests could lead to substantial cost savings and

[i] In the context of COVID-19 testing, a reagent is a chemical used in a reaction to detect or measure a substance of interest. A critical part of COVID-19 testing, reagents typically are used in a lab to test patient swab samples to determine a positive or negative COVID-19 result.

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